🚁 PRODUCT DATA SHEET

Product Name: AQUA-QHEV VTOL Phantom MkX **Designation**: Ambient Quantum Hybrid Energy Vehicle – Dual Mode (Ground + VTOL) **Version**: MkX (Mark 10) **Category**: Ultralight hybrid flying car / ambient-powered mobility platform

📋 CORE SPECIFICATIONS

Attribute	Description
Modes	Ground drive + VTOL flight
Energy Sources	RF, solar, piezoelectric, thermoelectric, triboelectric, quantum harmonic, hydrogen microcell
Power Management	Ambient energy routing AI + Active Power Factor Correction (APFC)
Flight Time	10–20 minutes
Ground Range	50–80 miles
Speed (Air)	~40 mph
Speed (Ground)	~45 mph
Weight	~300–400 lbs
Passenger Capacity	1–2
Cost Estimate	$2,800–$3,200
Compliance	FAA Part 103 (air), FMVSS 305a (ground), EPA hydrogen exemption
Assembly	Tool-free modular snap-fit using expired patents

⚙ SUBSYSTEM OVERVIEW

🔋 Ambient Energy Harvesting (SPTT-LM Membrane)

- **Solar Layer**: Transparent thin-film PV with nano-gratings
- **Piezo Layer**: PVDF sheets on morphing surfaces
- **Thermo Layer**: Bi_2Te_3 junctions with etched heat spreaders
- **Triboelectric Layer**: Nano-pillars on rotor arms and body panels
- **RF Layer**: Printed antennas + Cockcroft–Walton rectifiers
- **Quantum Harmonic Mesh**: Tuned oscillator grid for passive vibrational energy

🔋 Hydrogen Microcell Module

- Water-fed ceramic membrane electrolysis
- Coconut carbon ultracapacitor storage
- Emission: Water vapor only
- Lift assist for VTOL mode

Morphing Technology

- Shape-shifting rotor blades
- Retractable lift arms
- Adaptive solar panels
- Terrain-responsive wheel covers
- Responsive stabilizers

Control Core

- Hybrid dashboard (analog + digital)
- Ambient energy routing AI
- Open-source diagnostics firmware
- Autonomous-ready logic
- Manual override + analog fault indicators

PERFORMANCE METRICS

Metric	Value
Ground Range	50–80 miles
VTOL Flight Time	10–20 minutes
Speed (Ground)	45 mph
Speed (Air)	~40 mph
Energy Recovery	30–40%
Water Usage	~1 liter per 100 miles
Hydrogen Output	~0.5–1.2 L/min
Emissions	Zero (water vapor only)
Assembly Time	~6–10 hours (modular build)

MATERIALS & STRUCTURE

- Origami-folded body panels

- Recycled PET, aluminum, and hemp composites
- Nano-etched hydrophobic surfaces
- Aerogel crash padding
- Snap-fit modular joints
- Low-VOC coatings

REGULATORY COMPLIANCE

Mode	Regulation	Status
Ground	FMVSS 305a	Compliant
VTOL	FAA Part 103	Ultralight
Hydrogen	EPA & DOT	Microcell exempt
Charging	NEVI	Compatible with CCS/NACS

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⚙ Subsystem Overview

- **SPTT-LM Membrane**: Layered ambient energy harvesting skin
- **Quantum Harmonic Mesh**: Passive vibrational energy capture
- **Hydrogen Microcell Module**: Water-fed electrolysis for lift assist
- **Morphing Components**: Rotor blades, lift arms, solar panels, wheel covers
- **Control Core**: Hybrid dashboard, diagnostics firmware, autonomous-ready logic
- **Safety Systems**: Emergency glide mode, optional parachute, analog override

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□ PATENT DRAFT FRAMEWORK

Title: Ambient-Powered Dual-Mode Vehicle with Morphing Surfaces and Quantum Energy Harvesting
Inventor: [Your Name or Entity]
Filing Type: Utility Patent
Jurisdiction: United States Patent and Trademark Office (USPTO)

□ Abstract

A modular, dual-mode vehicle capable of ground and vertical flight operation, powered by ambient energy sources including RF, solar, piezoelectric, thermoelectric, triboelectric, and quantum harmonic oscillation. The system integrates morphing surfaces and a hydrogen microcell module for enhanced lift and sustainability.

□ Claims (Sample Structure)

1. A vehicle comprising a dual-mode propulsion system for ground and VTOL operation.
2. A multi-layered ambient energy harvesting membrane (SPTT-LM) integrated into the vehicle body.
3. A quantum harmonic oscillator mesh embedded within the chassis for passive vibrational energy capture.
4. A hydrogen microcell module configured to generate lift-assist hydrogen via water-fed electrolysis.
5. Morphing rotor blades and lift arms responsive to environmental conditions.
6. A control system comprising analog diagnostics, autonomous logic, and ambient energy routing AI.
7. A modular assembly system using tool-free snap-fit joints and recycled composite materials.

□ Prior Art References

- US9573585B2 – Hybrid vehicles
- Expired patents on piezoelectric harvesting, Cockcroft–Walton rectifiers, and shape-memory morphing structures
- Open-source control logic from Arduino, PX4, and ROS

□ Flying Car Comparison Matrix

Sources: Alef Model A2□7}, Samson Sky, XPeng AeroHT, AQUA-QHEV VTOL Phantom MkX (custom concept)

Feature / Vehicle	AQUA-QHEV VTOL Phantom MkX	Alef Model A2	Samson Sky Switchblade	XPeng AeroHT
Type	Dual-mode (ground + VTOL)	Dual-mode (road + VTOL)	Roadable aircraft	VTOL only
Energy Source	Ambient + Hydrogen + Solar	Battery-electric	Gasoline (ICE)	Battery-electric
Energy Harvesting	RF, Piezo, Thermo, Tribo, Quantum	None	None	None
Hydrogen System	Microcell electrolysis	Planned (future)	□	□
Morphing Technology	Rotor blades, lift arms, solar panels	□	□	□
Flight Range	10–20 min (VTOL)	~110 miles	~450 miles (fixed-wing)	~22 miles

Feature / Vehicle	AQUA-QHEV VTOL Phantom MkX	Alef Model A2	Samson Sky Switchblade	XPeng AeroHT
Ground Range	50–80 miles	~200 miles	~100 miles	
Speed (Air)	~40 mph	~60 mph	~190 mph	~80 mph
Speed (Ground)	45 mph	~25 mph	~100 mph	
Weight	~300–400 lbs	~850 lbs	~1,800 lbs	~1,000 lbs
Passenger Capacity	1–2	2	2	2
FAA Certification	Ultralight (Part 103)	Experimental approval	In progress	In progress
Cost Estimate	~$2,800–$3,200	~$300,000	~$170,000	~$140,000
Assembly Type	DIY modular (expired patents)	Factory-built	Kit-built	Factory-built
Sustainability	Zero emissions + recycled materials	Electric only	ICE emissions	Electric only
Autonomous Capability	Optional (open-source)	Planned		Planned
Unique Features	Ambient-powered, morphing, hydrogen boost	Box-wing flight mode	Retractable wings	Foldable rotors

Strategic Takeaways

- **AQUA-QHEV MkX** is the only platform with **ambient energy harvesting**, **hydrogen microcell lift assist**, and **morphing technology**.
- It’s radically more **affordable**, **modular**, and **sustainable** than any competitor.
- Alef leads in **regulatory approval** and **road-legal VTOL**, but lacks energy innovation.
- Samson Sky offers **long-range fixed-wing flight**, but uses fossil fuel and lacks VTOL.
- XPeng AeroHT is sleek and electric, but **not roadable** and has limited range.

PRODUCT DEFINITION SHEET (PDS)

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